

## Department of Energy

## § 429.44

capacity in British thermal units per hour (Btu/h).

(viii) Single package vertical heat pumps: The energy efficiency ratio (EER in British thermal units per Watt-hour (Btu/Wh)), the coefficient of performance (COP), and the cooling capacity in British thermal units per hour (Btu/h).

(c) Alternative methods for determining efficiency or energy use for commercial HVAC equipment can be found in § 429.70 of this subpart.

[76 FR 12451, Mar. 7, 2011; 76 FR 24775, May 2, 2011]

### § 429.44 Commercial water heating equipment.

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to commercial WH equipment; and

(2) For each basic model of commercial water heating (WH) equipment, efficiency must be determined either by testing, in accordance with applicable test procedures in §§ 431.76, 431.86, 431.96, or 431.106 and the provisions of this section, or by application of an alternative efficiency determination method (AEDM) that meets the requirements of § 429.48 and the provisions of this section. For each basic model of commercial WH equipment, a sample of sufficient size shall be selected and tested to ensure that—

(i) Any represented value of maximum standby loss or other measure of energy usage of a basic model for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the maximum of the  $i^{\text{th}}$  sample;

Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.95}$  is the  $t$  statistic for a 95% one-tailed confidence interval with  $n-1$  degrees of freedom (from Appendix A).

and

(ii) Any represented value of minimum thermal efficiency or other measure of energy consumption of a

basic model for which consumers would favor higher values shall be less than or equal to the lower of:

(A) The mean of the sample, where:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

and,  $\bar{x}$  is the sample mean; n is the number of samples; and  $x_i$  is the minimum of the  $i^{\text{th}}$  sample;

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.95, where:

$$LCL = \bar{x} - t_{.95} \left( \frac{s}{\sqrt{n}} \right)$$

And  $\bar{x}$  is the sample mean; s is the sample standard deviation; n is the number of samples; and  $t_{0.95}$  is the t statistic for a 95% one-tailed confidence interval with n-1 degrees of freedom (from Appendix A).

(b) *Certification reports.* (1) The requirements of § 429.12 are applicable to commercial WH equipment; and

(2) Pursuant to § 429.12(b)(13), a certification report shall include the following public product-specific information:

(i) Commercial electric storage water heaters: The maximum standby loss in percent per hour (%/hr), and the measured storage volume in gallons (gal).

(ii) Commercial gas-fired and oil-fired storage water heaters: The minimum thermal efficiency in percent (%), the maximum standby loss in British thermal units per hour (Btu/h), the rated storage volume in gallons (gal), the measured storage volume in gallons (gal) and the nameplate input rate in British thermal units per hour (Btu/h).

(iii) Commercial gas-fired and oil-fired instantaneous water heaters greater than or equal to 10 gallons and gas-fired and oil-fired hot water supply boilers greater than or equal to 10 gallons: the minimum thermal efficiency in percent (%), the maximum standby loss in British thermal units per hour (Btu/h), the rated storage volume in

gallons (gal), and the nameplate input rate in Btu/h.

(iv) Commercial gas-fired and oil-fired instantaneous water heaters less than 10 gallons and gas-fired and oil-fired hot water supply boilers less than 10 gallons: the minimum thermal efficiency in percent (%) and the storage volume in gallons (g).

(v) Commercial unfired hot water storage tanks: The minimum thermal insulation (*i.e.*, R-value) and the measured storage volume in gallons (gal).

(c) Alternative methods for determining efficiency or energy use for commercial WH equipment can be found in § 429.70 of this subpart.

[76 FR 12451, Mar. 7, 2011; 76 FR 24776, May 2, 2011]

**§ 429.45 Automatic commercial ice makers.**

(a) *Sampling plan for selection of units for testing.* (1) The requirements of § 429.11 are applicable to automatic commercial ice makers; and

(2) For each basic model of automatic commercial ice maker selected for testing, a sample of sufficient size shall be randomly selected and tested to ensure that—